Syllabus

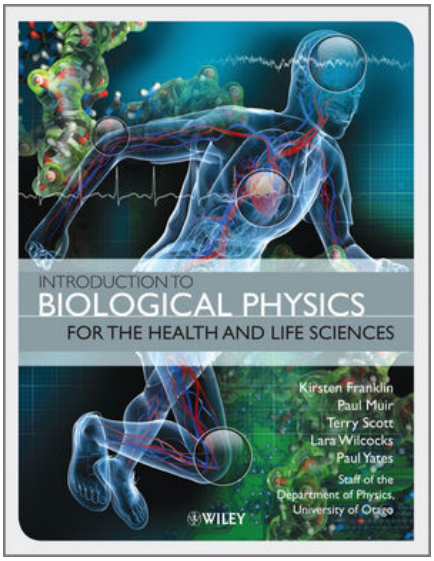
INTRODUCTION

PHYS 141H. Honors: Elementary General Physics I (5 cr) Lec 4, lab 3. Prereq: Good standing in the University Honors program or by invitation; MATH 102 or equivalent. Credit toward the degree may be earned in only one of: PHYS 141, 141H, and 151. Lab fee required. Topics covered include Mechanics, Heat, Waves, and Sound.

This is an introdutory science course intended for students majoring in biological sciences, pre-health sciences, and related programs. It is a quantitative course focused on recognizing, analyzing and solving problems involving physical principles and situations as a means of gaining greater insight into and understanding of the principles and process that govern the world around us. We will examine on the evidence upon which scientists base their theories, and the methods with which they make predictions and test them. Some of the content and activities connected with the course is available only online and access to an active internet connection will be required.

It is often said that the *language of science is mathematics*. This is indeed the case, to an extent, since key concepts and principles are most precisely articulated mathematically and the construction and manipulation of mathematical models is at the core of doing science. Therefore, it is essential that you have as a foundation the knowledge and skill with mathematal topics covered by MATH 102. These topics, most of which are summarized in Appendix B of your text, "*Introduciton to Biological Physics*", include the following: Arithematic, Measurement and Units, Algebra, Scientific Notation, Significant Digits, Exponentials and Logarithms, Geometry, Trigonometry, and Vectors. Although Calculus is not required, it will help you to better appreciate some of the mathematical analyses that we will perform.

COURSE MATERIALS



While most of the course content is provided here on My.UNL.edu (Blackboard) and can be accessed using the menu at left. You MUST also obtain the following required course materials and bring them to EVERY class.

REQUIRED:
Introduction to Biological Physics for the Health and Life Sciences, by Franklin, Muir, Scott, and Wilcocks
ISBN: 978-0-470-66593-0

REQUIRED: A pen or pencil, ruler and a protractor, and a calculator will all be needed to complete many in-class exercises.

An iClicker 2 registered to your name. (added 8/24/15)

GENERAL POLICIES

Style of Instruction: The design and execution of this course is based on the principle of "student-centered learning", which recognizes that learning best arises from student engagement with the subject, with peers, and with instructors. While there will be some lecturing, research shows just listening to a lecture is a poor way to gain deep understanding and retention of scientific concepts. Instead, you must engage with the material through "hands-on" practice of the content, and that learning from and explaining your understanding to your peers is extremely valuable. Your instructor has the responsibility of putting things in context and guiding you through the learning process, but the ultimate responsibility for learning the content falls on the student. Thus this course is structured as follows.

Time Commitment: Expect to spend 5 to 9 hours per week *outside of class* on course preparation, activities and assignments. You are responsible for following the calendar and deadlines by viewing all *required online materials* assigned before class and and completing all assignments on time. Sufficient time is allocated for all assignments, and therefore no late work will be accepted.

Attendance and Participation: In order to satisfy the structure for this course, you are expected to attend every class to engage in the material. Since much of the learning will be accomplished in class by interacting with peers, your attendance and participation is essential to the success of the entire class. Arrive on time and be ready at the scheduled time. Be fully present and alert in class so that you may obtain the maximum benefit. Contribute to discussion and group activities to the best of your ability. Do not pack up or leave before the class has been dismissed.

Assignment Deadline Policies: No late work will be accepted. Exceptions *may* be made at the instructor's discretion for unavoidable, reasons (e.g., illness or family emergency), provided you request this from your instructor in writing with full documentation as soon as possible, but no later than 48 hours after returning to classes.

Instructor Availability: I will be available in my office (Jorgensen Hall 310F) at the office hours listed in the syllabus, and may also be available by appointment or if you stop by my office. I am also largely available by e-mail during regular business hours. I may also answer some e-mails outside of regular business hours but I cannot guarantee that will be able to do this at any given time. There is also a Resource Center in Room 253 of Jorgensen Hall that is available on a first-come, first-served basis. If you need to turn in a assignment outside of class time, please bring it to my office. If I am not there, just slip it under the door.

Technology Policies:
(1) You will need internet access to do readings, complete assignements, and participate in group discussions.
(2) Check Blackboard regularly, at least once per day, for schedules and announcements. If I have an important message to send you between classes, I will use the Blackboard Email system, so please make sure that the email address that it has for you is current and that you check that email address regularly.
(4) Cell phone use is strictly prohibited in the classroom. Turn of your ringer and keep the phone out of sight, yours and everyone else's.
(5) Laptop or tablet use a not permitted without special permission of the instructor.

Class Conduct Policies:
In addition to policies outlined in this syllabus, you are expected to abide by all general

University of Nebraska-Lincoln policies. These include the Student Code of Conduct (with regard to plagiarism and cheating) and anti-discrimination policies. Some aspects of expected behavior during class time were covered above, but I will reiterate that I expect you to come to class prepared to learn, and that you foster a positive learning environment for yourself and your fellow students. Please participate enthusiastically in during the group activities, and please remain silent when appropriate. Please be respectful of everyone in both your language and conduct. That respect includes both personal respect and creating the proper classroom environment. If you need to visit the restroom, you do not need to seek permission, just leave quietly and return quietly as soon as you can.

Disability Accommodation:
Disabilities which require accommodation must be documented with the Services for Students with Disabilities (SSD) Office in the Canfield Administration Building (Room 132; phone 472-3787, voice or TTY) and brought to the attention of the instructor in a timely manner and in accordance with University policy. It is best to consult with the instructor during the first week of classes at the latest. If these requirements are met in a timely manner, all reasonable accommodations will be made to assist you in getting the most out of this course.

Instructor Discretion Policy:
Any exceptions to course policies will be made at the instructor's discretion without waiving the right to enforce those policies at a later date. For example, if the instructor accepts a late assignment from a student in any instance, that does not mean that this exception will be granted to another student or at another instance. Your instructor pledges to make all exceptions as fairly as possible, but they are still at the instructor's discretion.

ASSESSMENT (GRADES)

Exams: The course is organized into five segments. Each segment will be concluded by an Exam, which will be administered in class. Questions on the exams will be similar to those that appear in the PreClass assignments, in-class assignments, and Home Work. No make-up exams will be given.

PreClass Quizzes: The PreClass quizzes provide a measure of your preparation for class and provide feedback to the instrucgtor. They are designed around the method of "Just-In-Time Teaching," which is a widely used, scientifically tested, method for informing the instructor about student readiness just prior to class. PreClass quizzes must be completed by 10:30 AM the day **before** class meets.

Participation: Participation will be tracked through in-class assignments worked individually and in groups, and by the assesment of the instructor.

Projects: You will have to complete a total of three short "projects" related to the class content, approximately on every 4-5 weeks. These are not term papers or lengthy semester-long projects, but are opportunities for you to have a unique learning exprerience that suits your interests and talents. We will work

(updated 8/24/15, SPD

Item
5 Exams
PreClass Assignn
Participation
Home Work
Projects
Labortory
Total
Grade
Some type of A
Some type of B
Some type of C
Some type of D

Note: The final let

together to design and define these projects.

Final Exam: There is no separate final exam. Exam 5 will be taken during Finals week, as specified in the Course Schedule

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Physics 141 class.

ACE CERTIFICATION FOR PHYS 141H

(i) the ACE Outcome(s) for which the course is certified

Student Learning Objective 4 (SLO 4): Use scientific methods and knowledge of the natural and physical world to address problems through inquiry, interpretation, analysis, and the making of inferences from data, to determine whether conclusions or solutions are reasonable.

(ii) the opportunities the course will give students to acquire the knowledge or skills necessary to achieve the Learning Outcome(s)

Mathematics and Statistics

The course makes extensive use of mathematical analysis as a central and essential component of estimation, problem solving, and evaluation of solutions. The mathematical methods most used are algebra, trigonometry, vectors, unit analysis, and numerical computation.

Critical Thinking

The course emphasizes the development of mature appraisal and problem solving techniques, which involve C**ritical Thinking** at three key stages. First, in setting up the analysis, students must learn to identify the essential physical principles and to which part of the system or process they apply. Second, in developing the solution, the students must identify useful and valid assumptions about how the system should behave, and relate this to the mathematical representation of the solution. Third, the students must evaluate and test the solution for reasonableness and accuracy. This is particularly important when they are working with phenomena, such as the behavior of subatomic particles, that are not part of everyday experience, or the validity of assumptions and approximations, such as the neglect of friction when its effects have insignificant influence on the outcome. Even in the case of everyday experience, the must learn to challenge their own, frequently flawed, preexisting conceptions.

Problem Solving

Problem solving is by far the main activity in the course. Therefore most of the effort in the course is focused on the process and tools for solving problems involving physical systems.

(iii) the graded assignments which the instructor(s) will use to assess the student'

achievement of the Outcome(s).

Student abilities for appraising physical situations is assessed in several ways. The course grade is based on a cumulative score that is derived from the following components, which are all graded and weighted according to the breakdown given in the syllabus. For each lecture assessment activities include student responses to (i) pre-class quizzes, (ii) in-class exercises, and (iii) follow-up homework exercises and problems. For the weekly laboratory sessions, students are assessed based on vi) lab-preparation quizzes and vii) a report of the results, analysis, and conclusions drawn from the laboratory results. Progress in the course as a whole is assessed with (viii) unit midterm exams. The pre-class quizzes, concept questions, and some of the homework exercises focus on specific knowledge, basic computational skills, and grasp of key concepts. The students' integrative understanding of physical principles and problem-solving is assessed with the more complex homework problems, in-class exercises, and the exams.

Physics 141H Topics Schedule, Fall 2015

Week #	CH	#p	Title	Date	Week #
1	I		**Course Intro & Math**	24-Aug	1
	1	14	Kinematics	26-Aug	
2	2	12	Newton's Laws	31-Aug	2
	3	6	Circular Motion	2-Sep	
3	–		**Labor Day**	7-Sep	3
	4	9	Statics	9-Sep	
4	T		**Test 1**	14-Sep	4
	5	14	Energy	16-Sep	
5	6	6	Momentum	21-Sep	5
	7	10	SHM	23-Sep	
6	8	9	Waves	28-Sep	6
	9	16	Sound	2-Oct	
7	E		**Extra Day**	9-Oct	7
	T		**Test 2**	12-Oct	
8	10	8	Elasticity	14-Oct	8
	11	14	Pressure	21-Oct	
9	–		**Fall Break**	19-Oct	9
	12	6	Buoyancy	21-Oct	
10	13	8	Surface Tension	26-Oct	10
	15	6	Viscous Fluids	28-Oct	
11	T		**Test 3**	2-Nov	11
	14	8	Fluid Dynamics	4-Nov	
12	16	6	Mole Transport	9-Nov	12
	17	10	Temperature	11-Nov	
13	18	12	Ideal Gas	16-Nov	13
	T		**Test 4**	18-Nov	
14	19	12	Phases	23-Nov	14
	–		**Thanksgiving**	25-Nov	
15	20	12	Water Vapor	30-Nov	15
	21	10	Heat Transfer	2-Dec	
16	22	8	Body Heat	7-Dec	16
	E		**Extra Day**	9-Dec	
Finals	T		**Test 5**	17-Dec	Finals
	E		**Extra Day**		